ORSOTRIAENA MEDUS LICIUM (FRUHSTORFER) (LEPIDOPTERA: NYMPHALIDAE: SATYRINAE) IN QUEENSLAND, AUSTRALIA

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Abstract

The underside ocelli patterns and the width and prominence of the underside white transverse lines on 39 specimens of *Orsotriaena medus licium* (Fruhstorfer) from Papua New Guinea and 91 *O. m. moira* Waterhouse & Lyell from Torres Strait were examined and their variability assessed. Based on these assessments, *O. m. moira* is placed as a new synonym of *O. m. licium*, with the latter becoming the appropriate subspecific name for *O. medus* (Fabricius) in Australia. In addition, specimens of *O. m. licium* from Torres Strait, collected throughout the wet season, showed a higher frequency of extra ocelli on the underside of the wings of both sexes than specimens from Papua New Guinea, which were mostly collected during the dry. In contrast, the width and prominence of the underside white transverse lines in both populations did not correlate with season or gender. Two Torres Strait specimens collected in February 1994, during the wet season, are similar to a dry season form recorded from India.

Introduction

Orsotriaena medus (Fabricius) is a tropical Indo-Australian satyrine butterfly occurring from India to southern China and the Philippines, throughout Malaysia, Indonesia and New Guinea, east to the Solomon Islands and Vanuatu and south to Australia through Torres Strait, including the northernmost tip of Cape York Peninsula (Parsons 1998, Braby 2000, Sands and New 2002). Within Australia, *O. m. moira* Waterhouse & Lyell is most frequently encountered on the northern and eastern islands of Torres Strait. It is considered rare in the south of the Strait and was last recorded at Cape York in 1976 (Braby 1995, 2000, Sands and New 2002, TAL unpublished data). It is generally confined to wet grassy areas along the edges of lowland rainforests and swamps (Braby 1995, 2000, Sands and New 2002) and in Torres Strait is predominately a wet season butterfly.

Within Torres Strait, *O. m. moira* is known from Darnley, Dauan, Moa, Murray, Thursday and Yam Is, which hold stands of monsoonal vine forest, and from Saibai, which is a flat mud island (Waterhouse and Lyell 1914, Lambkin and Knight 1990, Valentine and Johnson 1993, Braby 2000, TAL unpublished data). Dunn *et al.* (1994) considered it to be threatened by fire and vegetation clearance, particularly in Torres Strait, but Sands and New (2002) regarded the species as safe in Australia due to its close association with damp grassy environments. In Australia, its life history was described from material collected from Dauan Island by Johnson *et al.* (1995), who successfully reared larvae on the introduced *Panicum maximum* Jacq. (Poaceae: guinea grass) after enclosing females on *Imperata* sp. (Poaceae).

Braby (2000) questioned the validity of *O. m. moira* and considered it to differ little from the Papua New Guinea subspecies; he concluded that its

status was doubtful. Up until the last decade, few specimens were known from Australia, but in recent years more systematic collecting of butterflies in Torres Strait has been done and now more specimens of *O. m. moira* are available for study. An assessment of these additional specimens supports the doubt surrounding the status of *O. m. moira*. In this paper, the external facies of a series of *O. medus* from Torres Strait are examined and their variability documented, in particular the underside ocelli patterns and the white transverse lines. This variability is compared with that of specimens of *O. m. licium* (Fruhstorfer) from Papua New Guinea and a form of *O. medus*, perhaps seasonal, is recorded from Australia for the first time.

Abbreviations used are as follows: PNG – Papua New Guinea; AIK – A.I. Knight; EC – E. Cameron; EJLH – E.J.L. Hallstrom; MFB – M.F. Braby; PSV – P.S. Valentine; TAL – T.A. Lambkin; WWB – W.W. Brandt; ANIC – Australian National Insect Collection, Canberra; QDPI – Department of Primary Industries and Fisheries Collection, Brisbane; MFBC – M.F. Braby collection, Palmerston; TLIKC – Joint T.A. Lambkin and A.I. Knight collections, Brisbane; PSVC – P.S. Valentine collection, Townsville; UQIC – University of Queensland Insect Collection, Brisbane.

Material examined

QUEENSLAND (TORRES STRAIT): 18 ♂♂, 10 ♀♀, Dauan Island, 2.iv.2001 (♂, ♀), 4.iv.2001 (3 ♂♂, 2 ♀♀), 22.iv.2001 (♀), 24.iv.2001 (♀), 2.v.2001 (♀), 10.ii.2006 (♀), 14.ii.2006 (♀), 18.ii.2006 (♂), 20.ii.2006 (♀), 23.ii.2006 (♂), 24.ii.2006 (♂), 2.iii.2006 (♂), 8.iii.2006 (2 ♂♂, ♀), 9.i.2008 (♂), 10.i.2008 (2 ♂♂), 12.i.2008 (♂), 13.i.2008 (3 ♂♂), 19.i.2008 (♂), AIK (TLIKC); 9 ♂♂, 5 ♀♀, same data except 19.ii.2004 (6 ♂♂, 2 ♀♀), 20.ii.2004 (♀), 21.ii.2004 (♂, ♀), 22.ii.2004 (♂), 11.i.2006 (♀), 17.i.2008 (♂), TAL (TLIKC); 6 ♂♂, 3 ♀♀, same data except 2.iv.2004 (2 ♂♂), 3.iv.2004 (2 ♂♂, ♀), 6.iv.2004 (♂, ♀), 7.iv.2004 (♂, ♀), PSV (PSVC); 1 ♂, Green Hill, Thursday Island, 12-15.iv.1992, TAL (TLIKC); 1 ♂, Moa Island, 10°11'S, 142°18'E, 24.ii.1975, EC (UQIC); 9 ♂♂, 3 ♀♀, Murray Island, 22-25.iv.1989, TAL (TLIKC); 6 ♂♂, 1 ♀, same data except 29.iii.-4.iv.1986 (QDPI); 2 ♂♂, 3 ♀♀, same data except 24.iv.1989 (2 ♂♂, ♀), 25.iv.1989 (2 ♀♀), AIK (TLIKC); 2 ♂♂, 4 ♀♀, same data except 17.iii.1993 (♀), 14.iv.1993 (♀), 16.iv.1993 (♀), 18.iv.1994 (2 ♂♂, ♀), PSV (PSVC); 1 ♂, 1 ♀, Saibai Island, 5.iv.2001 (♀), 10.ii.2004 (♂), AIK (TLIKC); 4 ♂♂, 1 ♀, same data except 21.ii.1994 (2 ♂♂), 22.ii.1994 (♂, ♀), 1.iii.1996 (♂), TAL (TLIKC); 2 ♂♂, 1 ♀, same data except 11.iv.1994, PSV (PSVC).

PAPUA NEW GUINEA: 3 ♂♂, 1 ♀, Angoram (Sepik District), 20', 30.iii.1950 (♂), 6.iv.1950 (♀), 2.v.1950 (2 ♂♂), WWB & EJLH (ANIC); 1 ♂, 2 ♀♀, Bubia, nr Lae, no other collection data (UQIC); 3 ♂♂, Kiunga, Fly River, 2.vii-31.x.1957, WWB (ANIC); 5 ♂♂, Lae, 10.vi.1951 (2 ♂♂), 21.vi.1951 (♂), 3.vii.1951 (2 ♂♂), WWB & EJLH (ANIC); 1 ♂, Maprik (Sepik District), 600', 30.vi.1951, WWB & EJLH (ANIC); 2 ♂♂, 2 ♀♀, Marabi, Lae, Morobe Province, 12.vi.1999, MFB (MFBC); 1 ♂, Normanby Island, Wakaiuna, Sewa Bay, 23.x.1956-11.i.1957, WWB (ANIC); 5 ♂♂, 3 ♀♀, Rouku, Morehead River, Western District, no collection date (5 ♂♂, 2 ♀♀), 19.iii.-28.v.1962 (♀), WWB (ANIC); 7 ♂♂, 3 ♀♀, Subitana (Central District), Rauna, 1800 ft, 6.x.1949 (6 ♂♂, 3 ♀♀), 16.x.1949 (♂), WWB & EJLH (ANIC).

Methods and results

Orsotriaena medus is a variable species (Braby 2000), predominately in the numbers of ocelli in the subapical, subterminal and subtornal areas of the underside of both wings and in the width, prominence and length of the underside white transverse line. The variability of these two features was investigated in 39 specimens of *O. m. licium* and 91 of *O. m. moira* from PNG and Torres Strait respectively, to determine if differences within these features could be used to support their subspecific separation.

The number and positions of ocelli on specimens from Torres Strait were difficult to qualify, with some variation even within groups of specimens collected from single locations and at single times. Variability in the number of ocelli in some tropical Satyrinae has been reported previously (Owen 1971, Brakefield and Larsen 1984) and is also known for *O. medus*, where it appears to be seasonally influenced, with dry season individuals often having fewer underside ocelli (Bingham 1905, Woodhouse 1950, Wynter-Blyth 1957, Brakefield and Larsen 1984, Parsons 1998). This seemed to hold true for the material used in the present study. All Torres Strait specimens were collected over the wet season between January and May and contained a proportion of specimens (16/91, about 18%) with additional smaller ocelli (Fig. 1), whereas most had the more common ocelli pattern (Fig. 2). In contrast, almost all PNG specimens examined possessed the latter ocelli pattern (Fig. 3), with only two individuals having some extra small ocelli (Fig. 4). Almost all PNG specimens (when collection dates were known) were collected during the latter half of the year, when the season is typically dry (Parsons 1991). Because of this seasonal influence, the use of ocelli number as a diagnostic feature in comparing the two populations was considered unreliable.

The width and prominence of the underside transverse white lines were also assessed. For each specimen, measurements of the width of the transverse line were made in the subterminal area of the hind wing in the space between veins Rs and M_1, to assess if width and prominence of this line might be a discerning feature between the two populations. This character was also found to be variable. In both populations, individuals with a distinctive broad white line (approximately 1 mm wide), somewhat similar in appearance to that of *O. m. medus*, were the only specimens that could be reliably tagged and compared (although the white line in *O. m. medus* is also known to vary) (Fleming 1975, Corbet and Pendlebury 1978, D'Abrera 1983). About equal proportions of this form occurred in both populations, *i.e.* 8/39 (21%) in *O. m. licium* (Fig. 5) and 21/91 (23%) in *O. m. moira* (Fig. 1) The white transverse markings on the remaining specimens of both populations were highly variable and ranged from long, thin white prominent lines not wider than 0.5 mm (Figs 4, 6) to very faint, almost indistinguishable lines that were highly variable in length (Figs 2, 3, 7).

There was no correlation between the frequency of the morph with a broad white line and the gender of individual specimens, as this form was represented in both populations by similar male : female ratios (1 : 1 in *O. m. licium* and 1 : 1.3 in *O. m. moira*). This character did not seem linked to season as specimens from both populations showed the same overall degree of variability, despite being collected in different seasons. Moreover, a complete range of band widths was found in a series of 12 specimens, including both sexes, collected on Dauan Island in February and March 2006.

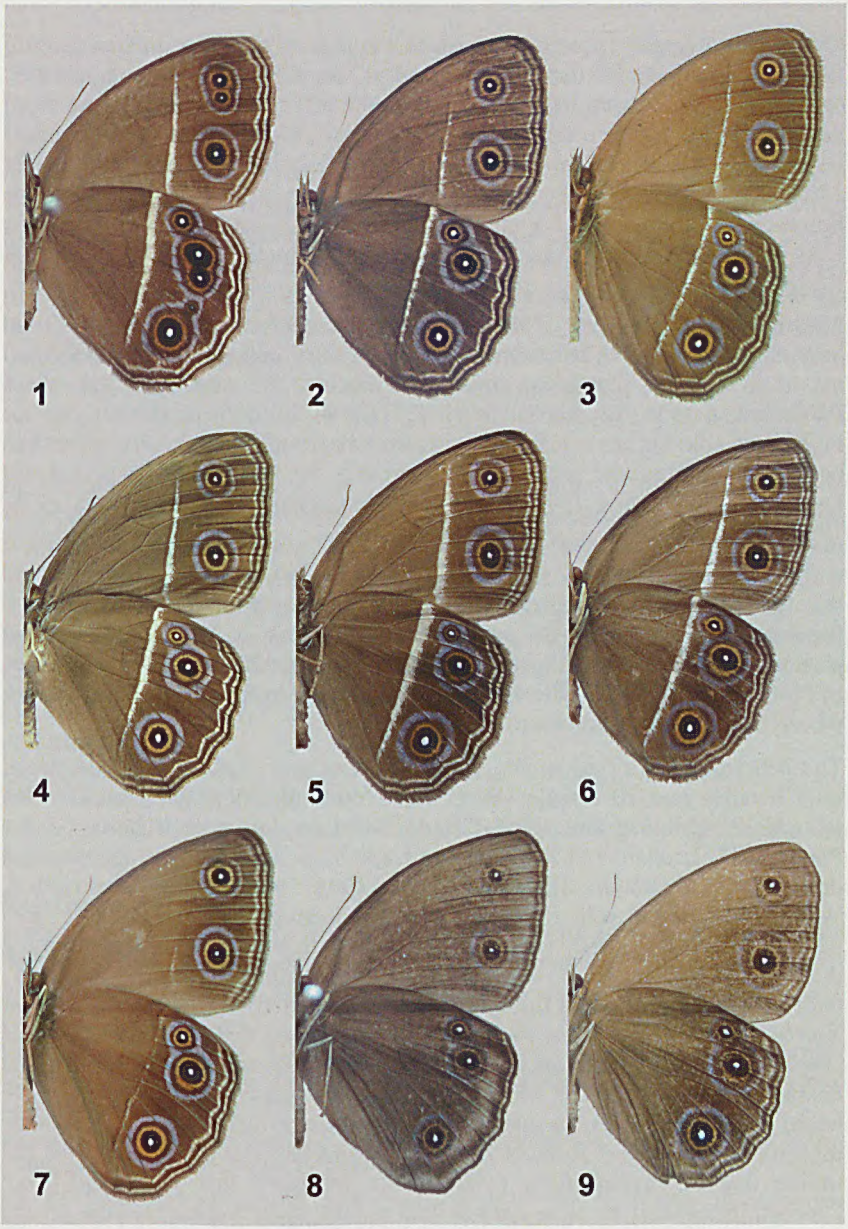
Two Torres Strait specimens collected on Saibai Island in February 1994 lacked all trace of the transverse lines (Figs 8, 9) and one of these was also devoid of the typical subterminal white slender lines on the underside of both wings (Fig. 8). Similar forms of *O. medus* have been reported from India during dry seasons (Bingham 1905, Woodhouse 1950, Wynter-Blyth 1957), wherein the white transverse markings are very much reduced or absent (Brakefield and Larsen 1984).

Discussion

The type locality of *O. medus* remains uncertain. Fabricius (1775) had erroneously indicated 'Capite Bonae Spei' [Cape of Good Hope, South Africa]. Waterhouse and Lyell (1914), Vane-Wright and de Jong (2003) and Tennent (2006) considered the type to have come from southern India but Edwards *et al.* (2001) followed Zimsen (1964) in regarding the type locality as Java, Indonesia. Nonetheless, across the species' range the markings on the underside of both wings are highly variable, in particular the number of ocelli and the width, length and prominence of the white transverse band or line. This variability has led to descriptions of a number of 'races' seemingly based primarily on the thickness of this underside white transverse line. Size and number of ocelli are highly variable in all races (Bingham 1905, Woodhouse 1950, Brakefield and Larsen 1984, Parsons 1998).

A number of subspecies have recently been synonymised with *O. m. medus* (Aoki *et al.* 1982, Vane-Wright and de Jong 2003) but Tennent (2006) still considered *O. m. licium* to be valid, although he noted that the regional biogeography of this species required revision.

Figs 1-9. *Orsotriaena medus licium* (Fruhstorfer). All figures are undersides and not to scale. (1) female, Dauan I., Torres Strait, 2.v.2001, AIK (TLIKC) [forewing length = 26 mm]; (2) male, Murray I., Torres Strait, 24.iv.1989, AIK (TLIKC) [23 mm]; (3) male, Subitana (Central District), Rauna, 1800 ft, PNG, 6.x.1949, WWB & EJLH (ANIC) [22 mm]; (4) male, Rouku, Morehead Riv., Western District, PNG (ANIC) [25 mm]; (5) male, Dauan Island, 2.iii.2006, AIK (TLIKC) [24 mm]; (6) male, Dauan I., 4.iv.2001, AIK (TLIKC) [23 mm]; (7) male, Kiunga, Fly Riv., PNG, 2.vii.-31.x., WWB (ANIC) [26 mm]; (8) male, Saibai I., Torres Strait, 21.ii.1994, TAL (TLIKC) [21 mm]; (9) male, Saibai I., 22.ii.1994, TAL (TLIKC) [23 mm].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Overall, the currently accepted subspecies appear to be: *O. m. medus* ranging from northern India east to Malaysia and western Indonesia (Bingham 1905, Corbet and Pendlebury 1978, D'Abrera 1983); *O. m. mandata* Moore from southern India and Sri Lanka (Bingham 1905, Woodhouse 1950, Wynter-Blyth 1957); *O. m. licium* from Sulawesi to Papua New Guinea (Fruhstorfer 1908, D'Abrera 1978, Parsons 1998); *O. m. mutata* (Butler) from the Solomon Archipelago and Vanuatu (Tennent 2002, 2006); and *O. m. moira* from Torres Strait and Cape York, Australia (Waterhouse and Lyell 1914, Braby 2000).

The most boldly marked of these subspecies are *O. m. mandata* and *O. m. mutata*, where the white transverse band is very prominent and broad, so much so that on some specimens it touches the edges of the ocelli (Woodhouse 1950, Wynter-Blyth 1957, Tennent 2002). The other races are highly variable but, as a rule, the transverse band on *O. m. medus* appears to be consistently broader and better defined than the band on *O. m. licium* and *O. m. moira* (Fleming 1975, Corbet and Pendlebury 1978, D'Abrera 1978, 1983).

Closer to Australia, Parsons (1998) reported *O. m. licium* as occurring widely throughout the PNG mainland and its offshore islands of New Britain, New Ireland, Bougainville and Daru. The occurrence of *O. m. licium* on Daru is of particular interest as it lies just off the southern coast of the Western Province of PNG, very close to Torres Strait and just 50 km northeast of Saibai Island, where *O. m. moira* is known to occur.

The description of *O. m. moira* by Waterhouse and Lyell (1914) was based on 22 males and 10 females from Cape York, Banks (Moa) and Darnley Islands. Waterhouse and Lyell (1914) failed to designate a holotype but Peters (1971) considered it likely that Cape York was the type locality and designated a lectotype (Edwards *et al.* 2001). Within their description, Waterhouse and Lyell (1914) made no mention of any feature that distinguished *O. m. moira* from *O. m. licium* from PNG, only mentioning that, on the underside, *O. m. moira* had 'a well defined white discal line', oddly a feature atypical of the specimens examined in this current study from Torres Strait and PNG. Furthermore, they indicated that the white line was 'variable in width and intensity', somewhat contradictory to their main character ('a well defined white discal line') on which they appear to have based their description. In addition, they offered no explanation to validate the grounds they used to erect their subspecies as their description was not unlike that of Fruhstorfer's (1908), who indicated that specimens from Celebes [Sulawesi] to New Guinea had a thin white transverse line on the underside. Based on my examination of Torres Strait and PNG specimens in this study, Fruhstorfer's (1908) description of *O. m. licium* matches the majority of specimens reviewed here. It is unknown whether Waterhouse and Lyell (1914) examined any New Guinea material at the time they described

O. m. moira, but if they had they surely would have noticed the similarity between *O. m. licium* and their Torres Strait material. What is possible is that they were unaware of *O. m. licium* at the time they described *O. m. moira*, as Fruhstorfer's (1908) description was published only six years earlier than theirs (Waterhouse and Lyell 1914).

The two Saibai Island specimens lacking any trace of an underside white transverse line were collected in February, which is typically wet in Torres Strait. This is opposite to that reported by Brakefield and Larsen (1984), who illustrated a form from Sikkim (in northern India) that was very similar to the two Torres Strait specimens but specified that it was strictly a dry season form. They also indicated that this form occurs in Bangladesh and in parts of Thailand and Burma. If the two Australian specimens reported here are seasonal in effect, then this is the first report of this dry season form from Australia.

In summary, the results of this current study indicate that the underside variability of *O. m. moira* from Torres Strait is similar to that of *O. m. licium* from Papua New Guinea. Ocelli number might be a seasonal character in both populations and the prominence of the underside white transverse line does not appear to be influenced by season or gender. Based on the evidence provided here, *O. m. moira* Waterhouse & Lyell is placed as a new synonym of *O. m. licium* (Fruhstorfer), with the latter name becoming the appropriate subspecific name for *O. medus* populations in Australia.

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